



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

BDE PROCEDURE MEMORANDUM

NUMBER: 52-06

SUBJECT: Mobile Source Air Toxics

DATE: July 11, 2006

The information in this memorandum supplements information in Sections 23-1.05(c), 23-1.05(d), 23-2.02(e), 24-3.07(e) and 25-3.09(e) of the BDE Manual. The information in this memorandum will be incorporated in the Manual in a future update.

Background

On February 3, 2006 the U.S. Department of Transportation, Federal Highway Administration, issued new guidance on when and how to analyze Mobile Source Air Toxics (MSAT) in the NEPA process for highway projects. The new guidance is found in their *Interim Guidance on Air Toxic Analysis in NEPA Documents*.

The Clean Air Act identified 188 air toxics, also known as hazardous air pollutants. The Environmental Protection Agency (EPA) has assessed this expansive list of toxics and identified a group of 21 as mobile source air toxics, which are set forth in an EPA final rule, *Control of Emissions of Hazardous Air Pollutants from Mobile Sources* (66 FR 17235). The EPA also extracted a subset of this list of 21 that it now labels as the six priority MSATs. These are **benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1, 3-butadiene**. While these MSATs are considered the priority transportation toxics, the EPA stresses that the lists are subject to change and may be adjusted in future rules.

The FHWA has developed a tiered approach for analyzing MSATs in NEPA documents. Depending on the specific project circumstances, FHWA has identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; or
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Applicability

The following procedures are applicable to State highway projects.

Procedures

1. Exempt Projects or Projects with No Meaningful Potential MSAT Effects

The types of projects included in this category are:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117 (c). See BDE Manual Section 23-1.05 (c) for examples of actions that would typically qualify as Group I Actions listed in 23 CFR 771.117 (c);
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126. See BDE Manual Section 26-11.03(b)(1.-3.) for exempt project types; or
- Other projects with no meaningful impacts on traffic volumes or vehicle mix

For project types qualifying as a categorical exclusion (Group I), under 23 CFR 771.117 (c), or for projects that are exempt under the Clean Air Act conformity rule under 40 CFR 93.126, include the following certifying paragraph in the Phase I Engineering Report:

Mobile Source Air Toxics

This project is of a type qualifying as a categorical exclusion (Group I) under 23 CFR 771.117(c), or exempt under the Clean Air Act conformity rule under 40 CFR 93.116, and as such, a Mobile Source Air Toxics analysis is not required.

For project types with no meaningful impacts on traffic volumes or vehicle mix such as found in 23 CFR 771.117(d) (See Section 23-1.05(d) of the BDE Manual), or 40 CFR 93.127 (See Section 26-11.03(b)(4.) of the BDE Manual), include the following text in the Phase I Engineering Report and associated Environmental Document:

Mobile Source Air Toxics

This project will not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions relative to the no-build alternative. As such, FHWA has determined that this project will generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special Mobile Source Air Toxic concerns. Consequently, this effort is exempt from analysis for MSATs.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. Even after accounting for a 64 percent increase in VMT, FHWA predicts MSATs will decline in the range of 57 to 87 percent, from 2000 to 2020, based on regulations now in effect, even with a projected 64 percent increase in VMT. This will both reduce the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.

2. Projects with Low Potential MSAT Effects

The types of projects included in this category are those that serve to improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions. This category covers a broad range of projects.

Any projects not meeting the threshold criteria for higher potential effects set forth in subsection (3) below and not meeting the criteria in subsection (1), should be included in this category. Examples of these types of projects are minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic is not projected to exceed the 140,000 AADT criterion.

For project types that have a low potential for MSAT effects, a qualitative assessment of emissions projections should be conducted. Four types of project documentation are offered: (a) a minor widening project; (b) an interchange with a new connector road; (c) an interchange without a new connector road; and (d) minor improvements or expansions to intermodal centers or other projects that affect truck traffic.

In addition to the qualitative assessment, the NEPA document for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with CEQ regulations 40 CFR 1502.22 (b). Recommended prototype language for this discussion is included at the end of this Procedure Memorandum.

Following are some examples of qualitative MSAT analyses for different types of projects. Each project is different, and some projects may contain elements covered in more than one of the examples below. District staff can use the example language as a starting point, but should tailor it to reflect the unique circumstances of the project being considered. The following factors should be considered when crafting a qualitative analysis:

- For projects on an existing alignment, MSATs are expected to decline unless VMT more than doubles by 2020 (due to the effect of new EPA engine and fuel standards).

- Projects that result in increased travel speeds will reduce emissions of the VOC-based MSATs (acetaldehyde, benzene, formaldehyde, acrolein, and 1, 3 butadiene); the effect of speed changes on diesel particulate matter is unknown. This speed benefit may be offset somewhat by increased VMT if the more efficient facility attracts additional vehicle trips.
- Projects that facilitate new development may generate additional MSAT emissions from new trips, truck deliveries, and parked vehicles (due to evaporative emissions). However, these may also be activities that are attracted from elsewhere in the metro region (thus, on a regional scale there may be no net change in emissions).
- Projects that create new travel lanes, relocate lanes or relocate economic activity closer to homes, schools, businesses and other sensitive receptors may increase concentrations of MSATs at those locations relative to No Action.

Introductory language for qualitative assessments for all projects:

This introduction should be preceded by the prototype language as provided at the end of this Procedure Memorandum, explaining what information is unavailable and incomplete.

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions—if any—from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

A.) Minor Widening Projects

For purposes of this scenario, minor highway widening projects are those efforts for which the ultimate traffic level is predicted to be less than 140,000 AADT. Widening projects that surpass this projection are considered major endeavors. Analyses of these major widening projects will be conducted on a case-specific basis. Include wording similar to the following:

For each build alternative carried forward in this (identify NEPA document), the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the Build Alternatives carried forward is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emission decreases will offset VMT-related emission increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT under each of the Build Alternatives carried forward are nearly the same, varying by less than _____ percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

This paragraph and the corresponding language in the next paragraph may apply if the road moves closer to receptors:

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools and businesses; therefore, under each Build -Alternative carried forward there may be localized areas where ambient concentrations of MSATs could be higher under certain Build Alternatives than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built at _____, under Alternatives _____, and along _____ under Alternatives _____. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-build alternative cannot be accurately quantified due to the inherent deficiencies of current models.

In summary, when a highway is widened and, as a result, moves closer to receptors, the localized level of MSAT emissions for the Build Alternative carried forward could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

This paragraph should also discuss any mitigation associated with the project such as cleaner construction equipment, truck stop electrification, buffers, etc.

B.) New Interchange with new connector roadway

This example is oriented toward projects where a new roadway section connects to an existing limited access highway. The purpose of the roadway is primarily to meet regional travel needs, e.g., by providing a more direct route between locations. Include wording similar to the following:

*For each build alternative carried forward in this (**identify NEPA document**), the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Build Alternative is higher than for any of the Build Alternatives carried forward, higher levels of regional MSATs are not expected from any of the Build Alternatives carried forward compared to the No Build Alternative. In addition, because the estimated VMT under each of the Build Alternatives carried forward are nearly the same, varying by less than _____ percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.*

Because of the specific characteristics of the project alternatives [i.e. new connector roadways], under each alternative carried forward there may be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new roadway sections that would be built at _____, under Alternatives _____, and along _____ under Alternatives _____. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In summary, under all Build Alternatives carried forward in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs. In comparing various project alternatives, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

This paragraph should also discuss any mitigation associated with the project such as cleaner construction equipment, truck stop electrification, buffers, etc.

C.) New Interchange/ no new connector roadway

This example is oriented toward interchange projects developed in response to or in anticipation of economic development, (e.g., a new interchange to serve a new shopping/residential development). Projects from the previous example may also have economic development associated with them, so some of this language may also apply. Include wording similar to the following:

*For each build alternative carried forward in this **(identify NEPA document)**, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the Build Alternatives carried forward is slightly higher than that for the No Build Alternative, because the interchange facilitates new development that attracts trips that were not occurring in this area before. This increase in VMT means MSATs under the Build Alternatives carried forward would probably be higher than the No Build Alternative in the study area. There could also be localized differences in MSATs from indirect effects of the project such as associated access traffic, emissions of evaporative MSATs (e.g., benzene) from parked cars, and emissions of diesel particulate matter from delivery trucks, depending on the type and extent of development. On a regional scale, this emissions increase would be offset somewhat by reduced travel to other destinations.*

BDE PROCEDURE MEMORANDUM 52-06

July 11, 2006

Page 8

Because the estimated VMT under each of the Build Alternatives carried forward are nearly the same, varying by less than _____ percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various Build Alternatives. For all Alternatives carried forward, emissions are virtually certain to be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future than they are today.

The following discussion would apply to new interchanges in areas already developed to some degree. For new construction in anticipation of economic development in rural or largely undeveloped areas, this discussion would be applicable only to areas where there are concentrations of sensitive populations, such as those found in nursing homes, schools, hospitals, and others:

The new ramps [and acceleration/deceleration lanes] [and additional lanes on the crossing arterial streets] contemplated as part of the project alternatives carried forward will have the effect of moving some traffic closer to nearby homes, schools and businesses; therefore, under each alternative carried forward there may be localized areas where ambient concentrations of MSATs would be higher under certain Alternatives than others]. The localized differences in MSAT concentrations would likely be most pronounced along the new/expanded roadway sections that would be built at _____, under Alternatives _____, and along _____ under Alternatives _____. However, as discussed above, the magnitude and the duration of these potential increases cannot be accurately quantified because of limitations on modeling techniques. Further, under all Alternatives carried forward, overall future MSATs are expected to be substantially lower than today due to implementation of EPA's vehicle and fuel regulations.

In summary, under all Build Alternatives carried forward in the design year it is expected there would be higher MSAT emissions in the study area, relative to the No Build Alternative, due to increased VMT. There could be slightly elevated but unquantifiable changes in MSATs to residents and others in a few localized areas where VMT increases, which may be important particularly to any members of sensitive populations. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

This paragraph should also discuss any mitigation associated with the project such as cleaner construction equipment, truck stop electrification, buffers, etc.

D.) Expanded Intermodal Centers or other projects which impact truck traffic, but that do not reach the category three criteria of “major new intermodal center”

The description for these types of projects depends on the nature of the project. The key factor from an MSAT standpoint is the change in truck and rail activity and the resulting change in MSAT emissions patterns. Include wording similar to the following:

For each build alternative carried forward in this (identify NEPA document), the amount of MSATs emitted would be proportional to the amount of truck vehicle miles traveled (VMT) and rail activity, assuming that other variables (such as travel not associated with the intermodal center) are the same for each alternative. The truck VMT and rail activity estimated for each of the Build Alternatives carried forward are higher than that for the No Build Alternative, because of the additional activity associated with the expanded intermodal center. This increase in truck VMT and rail activity would lead to the Build Alternatives carried forward to have higher MSAT emissions (particularly diesel particulate matter) in the vicinity of the intermodal center. The higher emissions could be offset somewhat by two factors: 1) the decrease in regional truck traffic due to increased use of rail for inbound and outbound freight; and 2) increased speeds on area highways due to the decrease in truck traffic (according to EPA’s MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases). The extent to which these emissions decreases will offset intermodal center-related emissions increases is not known.

Because the estimated truck VMT and rail activity under each of the Build Alternatives carried forward are nearly the same, varying by less than _____ percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA’s national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the EPA-projected reductions are so significant (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future as well.

This paragraph and the corresponding language in the next paragraph may apply if the intermodal center is close to other development:

The additional freight activity contemplated as part of the project alternatives carried forward will have the effect of increasing diesel emissions in the vicinity of nearby homes, schools and businesses; therefore, under each alternative carried forward there may be localized areas where ambient concentrations of MSATs would be higher than under the No Build alternative. The localized differences in MSAT concentrations would likely be most pronounced under Alternatives _____. However, as discussed above, the magnitude and the duration of these potential differences cannot be accurately quantified because of current limitations in modeling. Even though there may be differences among the Alternatives carried forward, on a region-wide basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will cause substantial reductions over time that in almost all cases the MSAT levels in the future will be significantly lower than today.

Insert a description of any emissions-reduction activities that are associated with the project, such as truck and train idling limitations or technologies, such as auxiliary power units; alternative fuels or engine retrofits for container-handling equipment, etc.

In summary, all Build Alternatives carried forward in the design year are expected to be associated with higher levels of MSAT emissions in the study area, relative to the No Build Alternative, along with some benefit from improvements in speeds and reductions in region-wide truck traffic. There could be slightly elevated but unquantifiable differences in MSATs among different Alternatives carried forward in a few localized areas where freight activity occurs closer to homes, schools and businesses, which may be important particularly to any members of sensitive populations. Under all alternatives carried forward, MSAT levels are likely to decrease over time due to nationally mandated cleaner vehicles and fuel.

3. Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences among project alternatives. To fall into this category, projects must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to exceed 140,000 by the design year;

And also,

- Be proposed to be located in proximity to populated areas or in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

Projects falling within this category should be more rigorously assessed for impacts. If a project falls into this category, the District should contact the FHWA, Illinois Division Office, for assistance in developing a specific approach for assessing impacts. This approach would include a quantitative analysis that would attempt to measure the level of emissions for the six priority MSATs for each build alternative carried forward, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of the FHWA assistance outlined above. The NEPA document should also include relevant prototype language on unavailable information outlined below. District staff should consult with BDE's Air Quality Specialist on documenting this information in their NEPA documents.

If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions, mitigation options as outlined below, should be identified and considered.

District staff should also consult with staff from FHWA, Illinois Division Office, for projects that do not fall within any of the project types listed above, but may have the potential to substantially increase future MSAT emissions.

MSAT Mitigation Strategies

Lessening the effects of mobile source air toxics should be considered for projects with substantial construction-related MSAT emissions that are likely to occur over an extended building period, and for post-construction scenarios where the NEPA analysis indicates potentially meaningful MSAT levels. Such mitigation efforts should be evaluated based on the circumstances associated with individual projects, and they may not be appropriate in all cases. However, there are a number of available mitigation strategies and solutions for countering the effects of MSAT emissions.

Mitigating for Construction MSAT Emissions

Construction activity may generate a temporary increase in MSAT emissions. Project-level assessments that render a decision to pursue construction emission mitigation will benefit from a number of technologies and operational practices that should help lower short-term MSATs. In addition, the SAFETEA-LU has emphasized a host of diesel retrofit technologies in the law's CMAQ provisions - technologies that are designed to lessen a number of MSATs.¹

Construction mitigation includes strategies that reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits when sites are near vulnerable populations. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-oriented mitigation. Also on the construction emissions front, technological adjustments to equipment, such as off-road dump trucks and bulldozers, could be appropriate strategies. These technological fixes could include particulate matter traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions. The use of clean fuels, such as ultra-low sulfur diesel, also can be a very cost-beneficial strategy.

The EPA has listed a number of approved diesel retrofit technologies; many of these can be deployed as emissions mitigation measures for equipment used in construction. This listing can be found at: www.epa.gov/otaq/retrofit/retroverifiedlist.htm

Post-Construction Mitigation for Projects with Potentially Significant MSAT Levels

Longer-term MSAT emissions can be more difficult to control, as variables such as daily traffic and vehicle mix are elusive. Operational strategies that focus on speed limit enforcement or traffic management policies may help reduce MSAT emissions even beyond the benefits of fleet turnover. Well-traveled highways with high proportions of heavy-duty diesel truck activity may benefit from active Intelligent Transportation System programs, such as traffic management centers or incident management systems. Similarly, anti-idling strategies, such as truck-stop electrification can complement projects that focus on new or increased freight activity.

The initial decision to pursue MSAT emissions mitigation strategies should be in consultation with BDE's Air Quality Specialist.

¹ SAFETEA-LU, Public Law 109-59, August 10, 2005

Prototype Language

For projects that require a quantitative or a qualitative analysis, include wording similar to the following for Compliance with 40 CFR 1502.22. This language should precede the specific qualitative or quantitative analysis in the environmental document.

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources. 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent.

As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

Unavailable Information for Project Specific MSAT Impact Analysis

Include wording similar to the following when information is unavailable for project specific MSAT Impact Analysis:

*This (**identify NEPA document**), includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the alternatives carried forward in this (**identify NEPA document**). Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:*

Information that is Unavailable or Incomplete

Include wording similar to the following when MSAT information is unavailable or incomplete:

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

- 1. Emissions. The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model--emission factors are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.*

These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to

capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. Dispersion. *The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The NCHRP is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.*

3. Exposure Levels and Health Effects. *Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.*

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs.

Include wording similar to the following summarizing scientific evidence of evaluating MSATs:

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at <http://www.epa.gov/iris>. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- *Benzene is characterized as a known human carcinogen.*
- *The potential carcinogenicity of acrolein cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.*
- *Formaldehyde is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals. 1,3-butadiene is characterized as carcinogenic to humans by inhalation.*
- *Acetaldehyde is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.*
- *Diesel exhaust (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.*
- *Diesel exhaust also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.*

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes -- particularly respiratory problems². Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

Include wording similar to the following for the above situations:

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives carried forward would have "significant adverse impacts on the human environment."

² South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

*In this document, FHWA has provided a qualitative (**or a quantitative analysis, as applicable**), of MSAT emissions relative to the various alternatives carried forward, and has acknowledged that (some, all, or identify by alternative) the project alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.*

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